

Flight, April 16, 1915



First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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With regard to photographs and descriptions of new British machines and those of our Allies, and other information which may be of help to our enemies, it should be noted that the Editor of FLIGHT, in the National interest, submits all matter of this character to the Official Press Censor before publication. Hence our readers will appreciate that many new departures in construction or advances in detail work are necessarily held back for the present rather than the smallest risk should be run of helping those who are so strenuously fighting the Allies for the enforcement of their "Kultured" militarism.—Ed.

EDITORIAL COMMENT.

More German "Paper" Threats of Aerial Invasion. Just as Germany's threat to close all the British ports to shipping by means of their submarines has resulted in very little more than a "paper" blockade, so have their long-continued threats of an aerial invasion of London so far proved merely another example of the "bluff" which, coupled with the acts of "frightfulness," has been such an outstanding feature of the Huns' tactics since the outbreak of the war. Although it is now a long time since any of the enemy's dirigibles ventured a journey over any part of the United Kingdom, it is evident that the German people are still being led to believe that some "colossal" undertaking of the kind is being contemplated and prepared for by the German air service. This is fairly evident from the *communiqué*

issued this week by the French Ministry of Foreign Affairs, drawing attention to a hair-raising statement of a Spanish traveller, who has lately returned from a tour in Germany and Austria. This gentleman sets forth the wild stories which are manufactured for home consumption by the German "lie bureau." He states that "the poorer classes of Germans have the greatest confidence in the Zeppelins. Their one obsession is—a general air attack on London. They believe absolutely what they have been told, viz., that next June 150 Zeppelins, flanked by 400 aeroplanes, fitted with aluminium motors, will take part in the raid."

In the early days of the war something akin to a mild panic existed in many parts of London and the provinces, householders and others almost tumbling over one another in their haste to pour gold into the pockets of the purveyors of anti-bomb insurance policies to the great profit of the underwriters. Fortunately a much saner view of the situation has latterly been taken, the boastful threats made by the Germans no longer disturbing the peace of mind of the British public.

Although an aerial raid of the Metropolis by the enemy is within the bounds of possibility, as we have always said, the probability of such an excursion upon any extended scale, or of its meeting with any serious success, should it materialise, is extremely remote, as our readers will appreciate. Dirigibles will doubtless continue to play their part in aerial work, but that part is strictly confined within known limitations.

One thing is certain. No tender scruples will enter into the calculations of the German High Command should opportunity serve them to send their aircraft across the seas. This visit, according to Mr. Karl H. von Wiegnaud, the Berlin correspondent of the *New York World*, will depend largely "upon the turn of events in the war." But we fancy there may be other and good reasons should the much-loved British be spared an aggressive dirigible episode. Its justification has been thoroughly argued out, from a military standpoint.

Thus it is claimed London is a fortified city; in the present war international treaties do not come into consideration as regards the employment of aerial craft, especially the bombardment by such. The Hague regulations for war on land and sea and the Hague agreement refer to bombardments by navies, and have only regulated war on land and sea and not in the air. The original Hague declaration regarding the prohibition against throwing bombs or explosives from airships has

expired in its former form, and in its newer form was not ratified by some of the belligerents, and, therefore, it does not hold good in the present war. Accordingly, when using airships belligerents are bound only by the aforementioned regulations in so far as these are consistent with general international principles, and the agreement regulating naval bombardment applies to aircraft. Any places must be considered as defended, under these principles, which take certain measures of defence against airships. According to the above, continues the German argument, London may be attacked through aircraft at all points wherever there are military constructions or buildings or establishments usable for military purposes. To this category belong especially docks and arsenals used for the Navy. Apart from that, a bombardment may also be directed against the city itself, as it is to be considered defended in the sense and meaning under the conditions of Article 2 of the Hague

Convention dealing with naval warfare. It may remain undecided as to whether the closing of the Thames by contact mines is perhaps a mine blockade in the Thames as well as on the shore. The fortifications along the river characterise the City of London itself as fortified. Those fortifications south of the city which approach within eight miles of the city must be considered as a direct defence of London. In addition the measures of defence undertaken in London through the mounting of guns in elevated places as well as the placing in readiness of armed aerial craft against attack from the air render London a place defended against aerial attack.

And so the argument goes on in the same measure as in respect to their submarine outrages, in order to justify any murderous attacks which in their blind passion they may perpetrate. But, as we have always held, the results will be very wide of their calculations, and Londoners will still go on sleeping calmly in their beds.

AIRCRAFT WORK AT THE FRONT. OFFICIAL INFORMATION.

In the despatch dated April 6th from an "Eyewitness" with the British General Headquarters there was the following:—

"A bomb was dropped by a German aeroplane on Armentières on Thursday (April 1st) without doing any damage, and during the night the hostile guns opened on our trenches on the left centre. On Friday our trench mortars were busy to good effect near Ploegsteert Wood."

In an official statement issued in Cairo on April 8th, referring to the affair with a Turkish cavalry patrol, a few miles N.E. of Kantara, there was the following:—

"All aeroplane reconnaissances show that there were no other bodies of troops within reach."

In the despatch dated April 9th, from "Eyewitness" there was the following:—

"A German aeroplane dropped four bombs near Le Bizet, north of Armentières, but no harm was done."

In the evening *communiqué* issued in Paris on April 8th it was stated:—

"To the north-west of the Bois de Montmire (to the north of Flirey), the cable of a captive balloon was severed by one of our shells and the balloon drifted across our lines towards the south-east."

In the evening *communiqué* issued in Paris on Sunday, there was the following:—

"Our aeroplanes dropped 155-millimètre (6½-inch) bombs on the maritime station and the foundry at Bruges."

A French official *communiqué* issued on the 7th inst. gave the following details of recent doings of the French aviators:—

"The first days of spring with their longer light have been marked by a recrudescence of activity on the part of our aviators. The official *communiqués* state that among operations more glorious and more directly efficacious, they cannot mention the daily work of aviation on the whole front of the armies. The Flying Corps has adapted itself to the necessities of position warfare. Its duties are manifold. It co-operates regularly in the artillery actions which take place daily at numerous points of the lines; its reconnaissance service furnishes the General Staff with precious information; and, finally, bombardments and the pursuit of enemy aeroplanes are still comprised among its essential and not the least perilous tasks."

"The plain story of a day of aerial operations will give some idea of the value of the effort furnished by this service. The work of April 2nd included 45 reconnaissances and 20 range corrections. Numerous photographs were also taken of the enemy's positions. On their side two aviation detachments were engaged in regulating artillery fire. The bombardment operations on that day were seven in number. At dawn, between 5 and 7 o'clock, a flying squadron dropped bombs in Alsace on the sheds of the Habsheim aviation ground, on the factory of Diet Willer, and the station of Walheim. At Bensdorf a bomb weighing 10 kilogrammes was dropped on the station and three bombs on the enemy's cantonments. At 10 minutes to 10 seven aeroplanes flew over the Woevre as far as Vigneulles, where the Germans were found to be constructing corrugated iron huts. These were riddled with bombs, which could be seen falling square on the buildings.

"The aviation ground of Coucy-le-Château, north of Soissons, and the station of Comines, in Belgium, were also bombarded. When darkness fell other aviators took the air. In Champagne three 90-millimètre bombs were dropped on the station of Sommery, and four on the station of Doutriens. The enemy bivouacs near l'Écaille and St. Étienne-sur-Suippe were struck by 90-millimètre bombs, and on other bivouacs near Bazancourt and Pont Faverger our airmen discharged a thousand arrows.

"Finally there is to be recorded the capture of an enemy aeroplane. On April 1st two Aviatiks had already been brought down, one by a well-aimed carbine shot after a very hot fight in the region of Soissons, and the other above the valley of the Lys by machine-gun fire, which hit the tank and set fire to the machine. About six in the morning of April 1st one of our aeroplanes cruising round Reims noticed an Albatros flying towards the city. Our man gave chase to it, and barring the way came under a sharp rifle fire, to which he replied effectively. The German aeroplane fell in our lines and the pilot and observer were made prisoners. It is by such constant and tireless activity and daring initiative that our airmen have indisputably achieved the mastery of the air."

In the evening *communiqué* issued in Paris on Tuesday there was the following:—

"Our aviators successfully bombarded the military sheds at Vigneulles, Woevre, and dispersed not far from there a battalion on the march."

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FLIGHT



SILHOUETTED AGAINST THE CLOUDED SUN.—A beautiful snap at Hendon Aerodrome last year of René Desoutter on a Caudron biplane.

The following note was issued by the French Ministry of Marine on Tuesday :—

" Yesterday the French battleship 'St. Louis,' with the co-operation of waterplanes, bombarded an important Turkish encampment in the neighbourhood of Gaza."

In an official statement issued in Petrograd on April 7th it was stated :—

" On the same day near Libau, a German seaplane was sunk, and the airmen who had devoted their energies to the dropping of bombs on the peaceful town of Libau were rescued by us and made prisoners."

The following *communiqué* from the Russian Main Army Headquarters was published in Petrograd on the same day :—

" On April 4th a hostile aeroplane dropped two bombs



THE BRITISH AIR SERVICES.

Royal Naval Air Service.

THE following announcement was made by the Admiralty on the 7th inst. :—

D. K. Cameron and C. W. Nutting have been granted Temporary Commissions as Lieutenants, R.N.V.R., with seniority of March 30th, and appointed to "President," additional, for R.N.A.S.

O. H. Crowther, H. L. Crowther, and N. Lea have been granted Temporary Commissions as Sub-Lieutenant, R.N.V.R., with seniority of March 30th, and appointed to "President," additional, for R.N.A.S.

The following Admiralty announcement was made on the 8th :—

Probationary Flight Sub-Lieuts. W. K. F. G. Warneford and C. W. Dickinson, confirmed in rank with original seniority, and appointed to "President," additional, for R.N.A.S. Both to date March 26th.

Temporary Commissions (R.N.V.R.) granted as follows :—

Lieutenants : C. J. Jackson, with seniority of April 5th, and E. D. Adams, with seniority of April 6th, and both appointed to "President," additional, for R.N.A.S.

Sub-Lieutenants : A. H. Hall, T. E. Viney, and G. N. Lindman, with seniority of April 5th ; C. A. Maitland-Heriot, with seniority of April 6th, and all appointed to "President," additional, for R.N.A.S.

The following Admiralty announcement was made on the 9th :—

J. G. Struthers, entered as Probationary Flight Sub-Lieutenant, for temporary service, with seniority of April 6th, and appointed to "President," additional, for R.N.A.S.

The following Admiralty announcement was made on the 10th :—

The following have been entered as Probationary Flight Sub-Lieutenants, with seniority of April 7th, and appointed to "President," additional, for R.N.A.S. : M. A. Simpson, J. F. Hutchinson, G. F. Smylie, F. H. Aspden, F. Fowlar, R. S. Smith, J. H. Rose and E. A. de Lossy de Ville.

The following Admiralty announcement was made on the 12th :—

Temporary Sub-Lieuts. (R.N.V.R.) W. Park, promoted to Temporary Lieutenant (R.N.V.R.), with seniority of April 8th ; F. C. Archer, to "President," additional, for duty with R.N.A.S. April 9th. W. A. Cocking, Temporary Commission and appointment cancelled. April 9th.

Temporary Commissions have been granted as follows :—

Lieuts. (R.N.V.R.) E. L. Dale, to the "President," additional, for duty with R.N.A.S. April 9th ; and C. A. W. Taylor, to the "President," additional, for R.N.A.S. April 11th.

Sub-Lieut. (R.N.V.R.) R. Chambers, to the "President," additional, for duty with R.N.A.S. March 30th. W. H. E. Campbell, entered as Probationary Flight Sub-Lieutenant, with seniority of March 29th, and appointed to the "President," additional, for R.N.A.S.

The following Admiralty announcement was made on the 13th :—

Temporary Sub-Lieuts. O. G. G. Villiers promoted to be Temporary Lieutenant, R.N.V.R., and appointed to the "President," additional, for R.N.A.S. To date February 28th. B. C. Windeler, to the "President," additional, for R.N.A.S. To date April 8th.

Royal Flying Corps (Military Wing).

THE following appeared in a supplement to the *London Gazette* issued on the 7th inst. :—

General Staff Officers.—1st Grade—Maj. C. C. Marindin, R.A., from 2nd grade, and to be Temporary Lieutenant-Colonel. March 9th.

2nd Grade—Maj. W. W. Warner, retired pay, I.A., vice Maj. C. C. Marindin, R.A. March 9th.

on our hospital near the station at Radom. The explosion which followed smashed the window panes in the hospital, and slightly wounded a soldier. On April 2nd and 3rd an Austrian aeroplane dropped five bombs on the hospitals at the station of Jaslo. On April 2nd bombs were dropped while wounded were in a hospital train."

In the *communiqué* issued in Petrograd on April 9th there was the following :—

" On the right bank of the Vistula, Cossacks brought down a German aeroplane. The two aviators were taken prisoners."

In a statement issued in Petrograd on Tuesday it was stated :—

" Near Dembe on the Narew we captured a German aeroplane with two aviators."



THE BRITISH AIR SERVICES.

3rd Grade—Temporary Lieut. R. F. Wigram, vice Maj. L. E. Morrice, D.S.O., R. of O. March 13th.

Deputy Director—Bt. Lieut.-Col. W. S. Brancker, R.A., from an Assistant Director, and to be Temporary Colonel. March 9th.

Assistant Director—Maj. D. S. MacInnes, D.S.O., R.E., from a Deputy Assistant Director, and to be Temporary Lieut.-Colonel. March 9th.

Deputy Assistant Director—Capt. G. M. Griffith, R.A., from a Staff Captain. March 9th.

Staff Captain—Capt. W. B. Caddell, R.A., and seconded. March 9th.

Flying Officers to be Flight Commanders.—March 24th, 1915. Lieut. G. A. K. Lawrence, R.A., and to be Temporary Captain ; Lieut. G. D. Mills, Sherwood Foresters (Nottinghamshire and Derbyshire Regiment), and to be Temporary Captain ; Capt. J. G. Weir, 3rd Highland (Howitzer) Brigade R.F.A., Territorial Force.

Assistant Equipment Officer.—Lieut. D. L. Allen, Princess Victoria's (Royal Irish Fusiliers), from a Flying Officer. March 29th, 1915.

Flight Commanders to be Squadron Commanders (ana to be Temporary Majors).—March 24th, 1915. Capt. Cuthbert G. Hoare, 39th King George's Own Central India Horse, Indian Army ; Capt. Cyril L. N. Newall, 2nd King Edward's Own Gurkha Rifles (Sirmoor Rifles), Indian Army.

Supplementary to Regular Corps.—Second Lieut. (on probation) Harold T. Musker is confirmed in his rank. George O. Hayne to be Second Lieutenant (on probation). January 25th, 1915.

The following appeared in a supplement to the *London Gazette* issued on the 8th inst. :—

Aeronautical Inspection Department.—Temporary appointment.

Assistant-Inspector.—Hon. Lieut. L. T. G. Mansell, from a Temporary Inspector of Ordnance Machinery, 3rd Class, Army Ordnance Department, to be Temporary Lieutenant, and to be transferred to the General List. March 23rd, 1915.

The following appeared in the *London Gazette* of the 9th inst. :—

Flying Officer.—Lieut. Alexander F. A. Hooper, Prince of Wales's (North Staffordshire Regiment), from the Reserve, and to be seconded. March 1st, 1915.

Supplementary to Regular Corps.—To be Second Lieutenants (on probation) : Norman H. Read. March 11th, 1915. Howard L. Cooper. March 15th, 1915. Clive F. Collett, Reginald M. Murray, Gerald Merton. March 25th, 1915.

The following appeared in a supplement to the *London Gazette* issued on the 12th inst. :—

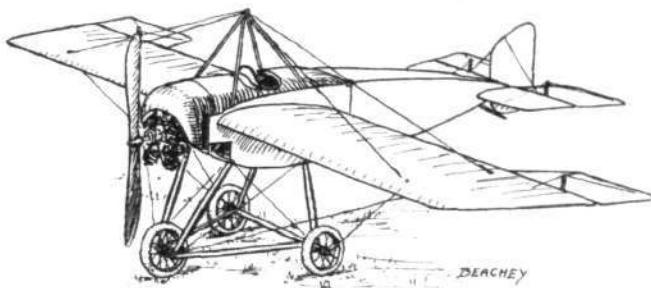
Flight Commanders to be Squadron Commanders.—Brevet Major H. R. P. Reynolds, Royal Engineers. March 27th, 1915. Capt. P. L. W. Herbert, Sherwood Foresters (Nottinghamshire and Derbyshire Regiment), and to be Temporary Major. March 28th, 1915. Capt. D. S. Lewis, D.S.O., Royal Engineers, and to be Temporary Major. April 2nd, 1915.

Flying Officers.—March 19th, 1915. Temporary Lieut. S. G. Gilmour, 12th (Service) Battalion (Princess Louise's) Argyll and Sutherland Highlanders, and is transferred to the General List, New Armies. Lieut. L. F. Richard, Royal Artillery, and to be seconded. Second Lieut. M. H. Monckton, Royal Artillery, and to be seconded. Lieut. R. E. B. Hunt, 3rd Batt. King's (Shropshire Light Infantry), and to be seconded. March 29th, 1915.

Supplementary to Regular Corps.—To be Second Lieutenants (on probation) : Algernon J. Insall. March 12th, 1915. Gilbert S. M. Insall. March 14th, 1915.

THE BEACHEY EXHIBITION MONOPLANE.

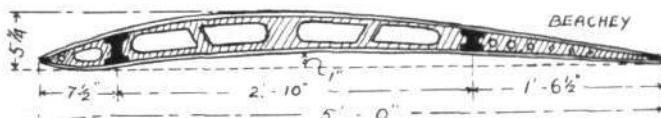
LINCOLN BEACHEY, America's most daring "stunt" flyer, who met his death just recently whilst giving a looping exhibition at San Francisco, had only shortly before got out the designs for a neat little monoplane which he intended to use in his future exhibitions, and two of these machines were being built at San Francisco. Most of the details of design were worked out by Mr. W. S. Eaton, special attention having been given to the quick assembling and dismantling of the machine. By the use



THE BEACHEY MONOPLANE.—Three-quarter view from the front.

of specially designed fittings both operations should be accomplished within 30 minutes.

The wings, of the rigid non-warping type, having a Morane-Saulnier plan form, are in two 12-ft. sections and perfectly straight; that is, they have no dihedral



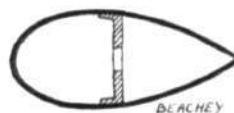
THE BEACHEY MONOPLANE.—A main rib, showing the wing section and construction.

angle. The wing section employed has been calculated from N.P.L. data to give speed; the maximum and minimum camber are $5\frac{1}{4}$ ins. and 1 in. respectively, and the under portion of the leading edge is slightly turned up as in the Nieuport wing section. Spruce is employed for the main spars, which are of I section tapering towards the outer extremities. The front spar is located $7\frac{1}{2}$ ins. from the leading edge, which is of wood, and the rear spar is 1 ft. $6\frac{1}{2}$ ins. from the trailing edge, which consists of steel tubing, except for a wood portion where the balancing flaps are hinged. The main ribs, spaced 16 ins. apart, are built up as shown in one of the accompanying sketches, of spruce flanges and cut-out fillers bored for lightness. Between each main rib are wood battens running from leading to trailing edge, whilst from the front spar to the leading edge a false rib is placed between the main ribs and the battens, which thereby greatly strengthens the front portion of the wing. The wings are internally braced with steel cable, and covered with Irish linen doped with Christofferson varnish. The attachment to the body is by means of quick detachable clamps, whilst the external bracing is by extra heavy steel cable, the top cables being attached to a pyramid of four steel streamlined struts mounted on the body above the pilot's cockpit, and the under cables are attached to the landing carriage.

Hinged to the outer extremities of the rear spars are two balancing flaps, each measuring 4 ft. on the hinging

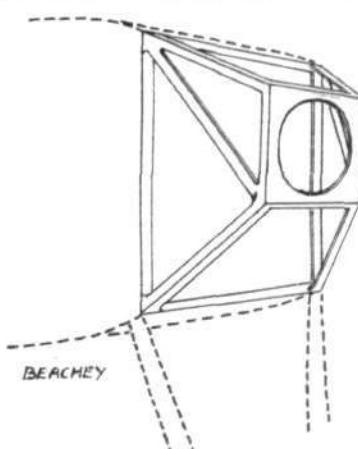
edge, 3 ft. 6 ins. on the trailing edge, by 2 ft. 3 ins. chord. They are constructed of tubular steel and spruce, the former for the outer frame and the latter for the attaching edge and ribs. These flaps are inter-connected, and are operated by a Curtiss type shoulder yoke, the control wires being carried in tubing placed within the wing along the rear spar. The tail planes consist of a horizontal stabilising surface in two portions, each measuring 3 ft. 6 ins. by 2 ft. 6 ins., one mounted either side of the body, and two elevator flaps (exactly similar in shape and size to the balancing flaps) hinged to the trailing edge of the stabiliser, and a partly balanced vertical rudder in between the elevators. The latter are operated by a to-and-fro motion of a vertical column, upon which is mounted a wheel actuating the rudder. The section of the stabiliser is similar to that of the wing, only, of course, reduced in proportion.

The body, which is 12 ft. 9 ins. in length, is divided into two portions fore and aft. The front portion, containing the pilot, engine, wings, under-carriage, &c., measures 5 ft. 9 ins., with a maximum depth and width of 2 ft. 3 ins. The rear portion, measuring 8 ft., tapers to a horizontal knife edge at the rear, where it also narrows somewhat. Both sections are built up on more or less usual lines with four longitudinals tapering towards the rear and streamlined connecting struts, all cable braced. These two sections are connected by very strong quick detachable joints. The nose of the body has an aluminium covering which forms a cowl over the engine—an 80 h.p.



The Beachey Monoplane.—Section of one of the steel struts.

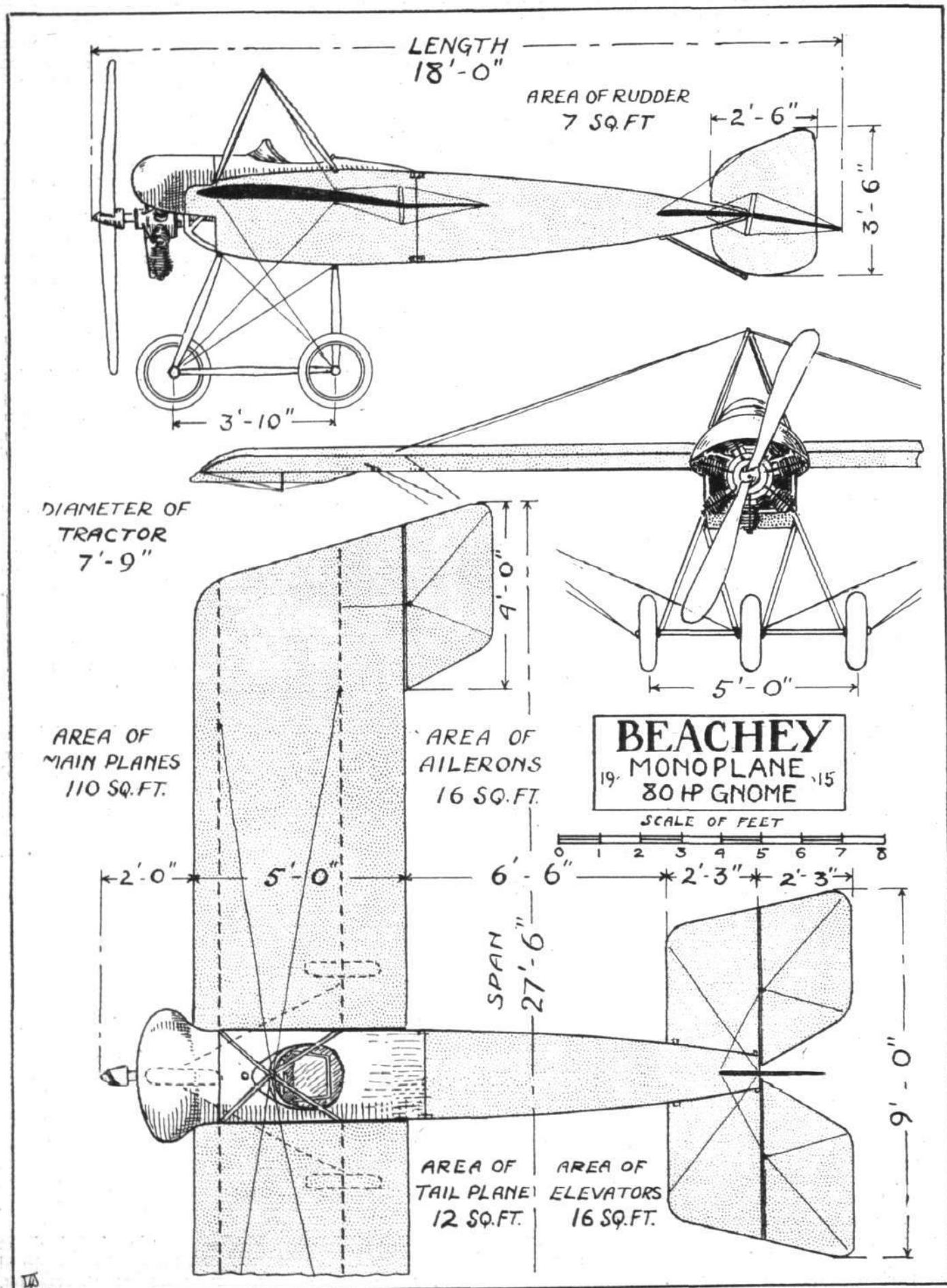
Monosoupape-Gnome—and a turtle back, in which is the pilot's cockpit, along the forward section of the body. The reason for streamlining the body struts is that should it be found necessary the covering on the after portion of the body can be removed, leaving the latter open as on the Blériot. The engine is supported in a specially constructed steel bearer, mounted on the nose of the body.



The Beachey Monoplane.—The steel engine mounting.

A 7 ft. 9 in. tractor screw, with 7 ft. 4 in. pitch, is direct coupled to the engine, and the fuel tanks are placed under the engine cowl. In front of the cockpit, which is well padded, is a small transparent wind shield that greatly reduces the wind pressure on

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THE BEACHEY MONOPLANE.—Plan, side, and front elevation to scale.

the pilot's face. Of the three-wheeled type, the undercarriage is exceedingly strong ; no shock-absorbing devices are employed, the necessary resiliency being provided by the 20 in. by 4 in. tyres fitted to the wheels. The latter are arranged two 5 ft. apart under the pilot's cockpit, and one 3 ft. 10 ins. in advance of the others. All three are connected by a triangular frame of steel tubing, whilst

FLYING AT HENDON.

HENDON'S second flying meeting opened on Saturday afternoon last at three with a ten minute flight by Marcus D. Manton on the 70 h.p. G.-W. biplane. The wind being in the neighbourhood of 25 m.p.h., Manton was able to give the spectators much to see in the way of skilled piloting. A little later on W. Birchenough came out on a new 80 h.p. Aircraft Henry Farman biplane, and put up some fine flying in his usual masterly style. He eventually steered off and delivered this machine to Farnborough. A lady passenger was then taken up on the 70 h.p. G.-W. biplane, and M. Osipenko ascended on the 50 h.p. G.-W. school 'bus. The next flight to be made was one on the 50 h.p. G.-W. tractor biplane "Lizzie," by C. W. Graham, who, as usual, gave a fine exhibition. J. L. Hall then went up on his 45 h.p. Caudron biplane and made a high flight. In the meanwhile the 100 h.p. G.-W. five-seater biplane was brought out of its shed at the far end of the aerodrome, and the spectators in the paddock all gathered as near as the circumstances permitted, and watched the running in of the 100 h.p. Green engine. Before this huge craft made its trial flight, however, Graham was up again on "Lizzie," E. Baumann made a flight on the 60 h.p. Gnome-Caudron, whilst J. S. B. Winter took up a passenger on the 50 h.p. G.-W. school 'bus. Further trips were then made by Osipenko on the 50 h.p. G.-W. 'bus, and E. Baumann on the 60 h.p. Caudron, after which six different makes of machine were seen in the air together. These were Manton on the 50 h.p. G.-W. 'bus, Hall on the 45 Caudron, Roche-Kelly on the 50 h.p. Beatty biplane, and high up were an Avro, a Sopwith, and a Maurice Farman. Roche-Kelly banked and spiralled "in and out" of the other machines in a most remarkable manner, and altogether it was quite an inspiring sight. Another pilot out during the afternoon was J. James, one of the instructors of the Ruffy-Baumann school, who flew a 45 h.p. two-seater Caudron. Manton made a few practice straights on the five-seater, and then took it up for several circuits with three passengers, handling it in fine style. He made a second equally successful flight later on with four passengers. One of the visitors on this afternoon was Sub-Lieut. Sydney Pickles, just back from beyond, looking very fit. During the rest of the evening most of the previously-mentioned pilots were in the air again, whilst the various schools started instruction.

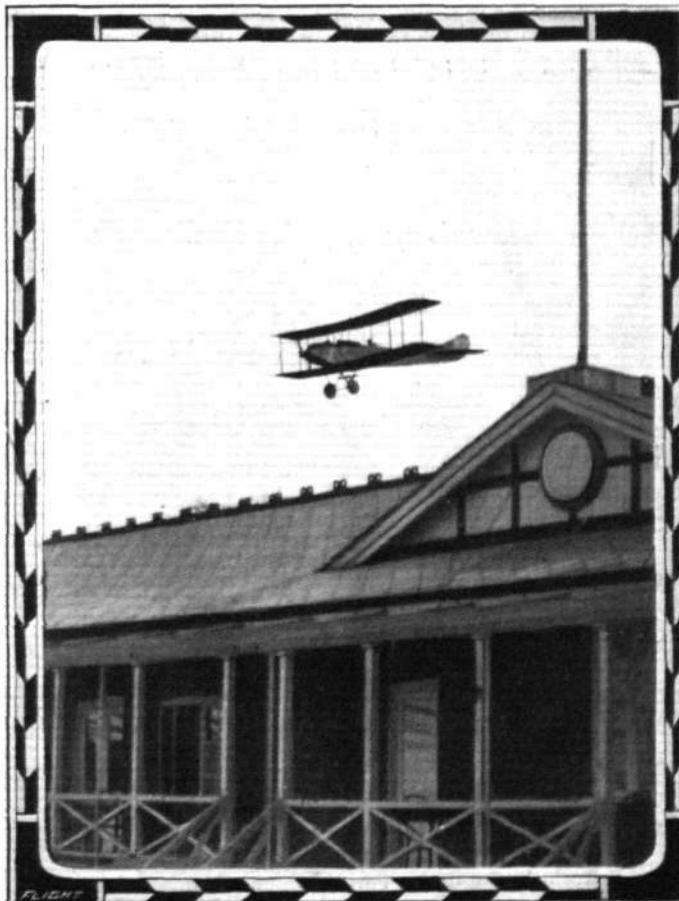
Sunday's flying was exceptionally good, for nearly all the Hendon pilots came out. From 3 p.m. until late evening, machines were constantly taking the air. It was just plain, straightforward flying, but there was plenty of it, and a pleasing variety in types of machines, a feature much appreciated by the spectators, judging from the remarks overheard. The pilots taking part in the afternoon's proceedings were E. Baumann, G. W. Beatty, G. W. Bransby-Williams, C. W. Graham, J. L. Hall, Marcus D. Manton, M. Osipenko, W. Roche-Kelly, and J. S. B. Winter. Manton piloted the 50 h.p. G.-W. tractor "Lizzie," the 100 h.p. G.-W. five-seater, and the 50 h.p. G.-W. school 'bus,

two pairs of steel streamlined struts connect the latter with the body, the whole carriage being cable-braced.

The general dimensions of the Beachey monoplane are : Overall span, 27 ft. 6 ins. ; span of wings, 26 ft. 6 ins. ; chord, 5 ft. ; supporting area, 110 sq. ft. ; overall length, 18 ft. ; weight empty, 520 lbs. ; speed, 45-100 m.p.h. ; gliding angle, about 1 in 5.

FLYING AT HENDON.

whilst the latter type machine was also flown by Osipenko and Winter. The five-seater 'bus, piloted by Manton, took up many passengers during the afternoon, and in the evening Osipenko made his first flight on this machine with two passengers. Graham, after "loaning 'Lizzie'" to Manton, flew his mount himself. Baumann and Hall both flew Caudron biplanes (60 h.p. Gnome and 45 h.p. Anzani respectively), whilst Beatty, Bransby-Williams, and Roche-Kelly, each flew Beatty-Wright biplanes. At one time all three were up together, Beatty on the 60 h.p. Wright-engined machine, Bransby-Williams on the 40 h.p. Wright-engined "blinkerless," and Roche-Kelly on the 50 h.p. Gnome "blinkerless." All of them banked and spiralled round about each other in such a manner as to make one almost dizzy. At the same time that the "Beatty bankers," as we heard them called, were up, four other machines were also in the air :—Hall's 45 Caudron, a G.-W. school 'bus, a Maurice Farman and an Avro. During school work in the evening, Hall made a very pretty glide on his Caudron with the tractor screw stationary, landing gracefully exactly on the spot where the school was pitched near No. 1 pylon.



The finish of an hour's Admiralty test. Mr. Hawker returning to Hendon on a Sopwith tractor.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING.

A SPECIAL Meeting of The Committee was held on Tuesday, the 13th inst., when there were present: Prof. A. K. Huntington, in the Chair, Mr. Ernest C. Bucknall, Mr. C. F. Pollock, and the Assistant Secretary.

Election of Chairman.—On the motion of Mr. C. F. Pollock, seconded by Mr. Ernest C. Bucknall, the Marquess of Tullibardeine, M.V.O., D.S.O., M.P., was unanimously elected Chairman of the Club for the current year.

Election of Vice-Chairmen.—On the motion of Mr. C. F. Pollock, seconded by Mr. Ernest C. Bucknall, Col. H. C. L. Holden, C.B., F.R.S., and Prof. A. K. Huntington were unanimously elected Vice-Chairmen for the current year.

New Members.—The following New Members were elected:—

Tom Harry England.

W. H. Maxwell.

Stanley May.

Sub-Lieut. Edward Manny Grave Morris.

Bertram Victor Roche.

Capt. Gerard Percy Wallace, S.A. Defence Force.

Aviators' Certificates.—The granting of the following aviators' certificates was confirmed:—

- 1123 Lieut. Lawrence Werner Wyld Lees, R.G.A. (S.R.) (Maurice Farman Biplane, Royal Flying Corps, South Harrow). March 17th, 1915.
- 1124 Flight Sub-Lieut. Arthur Vere Tabor, R.N.A.S. (Bristol Biplane, Royal Naval Air Station, Hendon). March 18th, 1915.
- 1125 William Geoffrey Cullen (Maurice Farman Biplane, Military School, Brooklands). March 21st, 1915.
- 1126 Jean Claude Charles Marduel (French subject) (Caudron Biplane, Richmond, N.S.W.). Jan. 16th, 1915.
- 1127 Lieut. Gerald Allen (The Connaught Rangers) (Maurice Farman Biplane, Royal Flying Corps, Farnborough). March 11th, 1915.
- 1128 2nd Lieut. William Reid (Maurice Farman Biplane, Royal Flying Corps, Shoreham). March 16th, 1915.
- 1129 (Hydro-aeroplane) Flight Com. Henry Meyrick Cave-Browne-Cave, R.N.A.S. (Short Hydro-aeroplane, Royal Naval Air Station, Isle of Grain). March 20th, 1915.
- 1130 Lieut. Frederick James Powell (Manchester Regt.) (Maurice Farman Biplane, Royal Flying Corps, Farnborough). March 2nd, 1915.
- 1131 Lieut. Francis Edgcombe Hellyer (The Hampshire Regt.) (Maurice Farman Biplane, Royal Flying Corps, Farnborough). March 2nd, 1915.
- 1132 Flight Sub-Lieut. Robert Dymond Gladman Sibley, R.N.A.S. (Maurice Farman Biplane, Royal Naval Flying School, Eastchurch). March 24th, 1915.
- 1133 Flight Sub-Lieut. John Findlay Hay, R.N.A.S. (Maurice Farman Biplane, Royal Naval Flying School, Eastchurch). March 24th, 1915.
- 1134 Lieut. Colin Critchley - Salmonson (R.M. Fusiliers) (Maurice Farman Biplane, Royal Flying Corps, Farnborough). March 25th, 1915.
- 1135 John Gay (Maurice Farman Biplane, Military School, Brooklands). March 30th, 1915.
- 1136 Arthur Claud Wright (Maurice Farman Biplane, Military School, Brooklands). March 30th, 1915.
- 1137 Capt. John Glanville Hearson, R.E. (Maurice Farman Biplane, Royal Flying Corps, Farnborough). March 11th, 1915.
- 1138 Flight Sub-Lieut. Arthur Connorton Saw, R.N.A.S. (Short Biplane, Royal Naval Flying School, Eastchurch). March 29th, 1915.
- 1139 2nd Lieut. Cecil St. George Lyster-Smythe (1st East Surrey Regt.) (Maurice Farman Biplane, Military School, Farnborough). March 20th, 1915.
- 1140 Capt. Reginald Alfred Cooper (Hampshire Yeomanry) (Maurice Farman Biplane, Military School, Farnborough). March 31st, 1915.
- 1141 2nd Lieut. Ian Woodford Aitken (13th Reserve Regiment of Cavalry) (Maurice Farman Biplane, Military School, Farnborough). March 31st, 1915.
- 1142 Flight Sub-Lieut. Frederick George Darby Hards, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). March 31st, 1915.
- 1143 George Lockhart Piercy Henderson (L. and P. Biplane, London and Provincial School, Hendon). March 31st, 1915.
- 1144 Charles James Chabot (Maurice Farman Biplane, Military School, Brooklands). April 1st, 1915.
- 1145 2nd Lieut. Charles Osborne Fairbairn (Loyal North Lancashire Regt.) (L. and P. Biplane, London and Provincial School, Hendon). April 2nd, 1915.
- 1146 Leonard Wright Learmount (Maurice Farman Biplane, Military School, Brooklands). April 2nd, 1915.
- 1147 Flight Sub-Lieut. Cuthbert Everard Brisley, R.N.A.S. (Bristol Biplane, Royal Naval Air Station, Hendon). April 4th, 1915.
- 1148 Gerrit Forbes (Wright Biplane, Beatty School, Hendon). April 5th, 1915.

The following Aviators' Certificates were granted:—

- 1149 Lieut. Edgar Francis Wanklyn Cobbold (7th Cheshire T.F.) (Maurice Farman Biplane, Central Flying School, Upavon). Feb. 9th, 1915.

- 1150 2nd Lieut. Frederick Howard Jenkins, R.F.C. (Maurice Farman Biplane, Royal Flying Corps, Shoreham). Feb. 26th, 1915.
- 1151 Lieut. Henry Anthony Patrick Disney (Cambridgeshire Regt.) (Maurice Farman Biplane, Royal Flying Corps, Shoreham). March 15th, 1915.
- 1152 2nd Lieut. Percy B. Brown (South Staffordshire Regt.) (Maurice Farman Biplane, Royal Flying Corps, Shoreham). March 17th, 1915.
- 1153 Francis Reynell Laver (Beatty Biplane, Beatty School, Hendon). March 24th, 1915.
- 1154 Lieut. The Hon. Laurence John Evelyn T. Wykeham-Fiennes (4th Battn. Oxford and Bucks Light Infantry), (Maurice Farman Biplane, Military School, Farnborough). March 29th, 1915.
- 1155 2nd Lieut. Alan Victor Hobbs, R.F.C. (Maurice Farman Biplane, Royal Flying Corps, Shoreham). April 2nd, 1915.
- 1156 Alfred Sebastian Goodwin (L. and P. Biplane, London and Provincial School, Hendon). April 5th, 1915.
- 1157 Alan Fitzroy Somerset-Leeke (Maurice Farman Biplane, Military School, Brooklands). April 5th, 1915.
- 1158 2nd Lieut. Vere Carol Melvill Gonville, R.G.A. (S.R.), (Maurice Farman Biplane, Royal Flying Corps, South Harrow). April 5th, 1915.
- 1159 Assistant Paymaster Lionel Douglas Dalzell-McKean, R.N., (Bristol Biplane, Royal Naval Air Station, Hendon). April 10th, 1915.
- 1160 Flight Sub-Lieut. Robin Gordon Mack, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). April 11th, 1915.
- 1161 Flight Sub-Lieut. George Hind Jackson, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). April 11th, 1915.
- 1162 Henry Edward Van Geethem (Maurice Farman Biplane, Military School, Brooklands). April 12th, 1915.
- 1163 Flight Sub-Lieut. Francis Joseph Bailey, R.N.A.S. (Bristol Biplane, Royal Naval Air Station, Hendon). April 12th, 1915.

THE FLYING SERVICES FUND.

Administered by The Royal Aero Club.

THE LORDS COMMISSIONERS OF THE ADMIRALTY AND THE ARMY COUNCIL HAVING SIGNIFIED THEIR APPROVAL, THE ROYAL AERO CLUB HAS INSTITUTED AND WILL ADMINISTER A FUND

The Roll of Honour.

THE FOLLOWING CASUALTY IN THE ROYAL FLYING CORPS ATTACHED TO THE EXPEDITIONARY FORCE HAS BEEN OFFICIALLY NOTIFIED BY THE WAR OFFICE :—

Undated :

Previously reported Missing, now unofficially reported to have Died as the result of an Aeroplane Accident.

Lieutenant A. St. J. N. Warrant, Black Watch and R.F.C.

Officially reported Missing and unofficially reported Prisoner of War.

Second Lieutenant O. Mansell-Moullin, R.F.C.

War Honours.

IN A SPECIAL SUPPLEMENT TO THE *London Gazette* ISSUED ON THE 9TH INST. THERE APPEARED THE FOLLOWING :—

"The King has been graciously pleased to give orders for the following officers to be Companions of the



Royal Aircraft Factory War Distress Relief Fund.

SINCE WE PUBLISHED THE FIGURES ON MARCH 19TH FOR THIS VERY SUCCESSFUL FUND, ITS ADMINISTRATION HAS BEEN CONTINUED WITH MARKED BENEFIT TO VARIOUS HELPFUL WAR RELIEF FUNDS. STARTING WITH A BALANCE IN HAND OF £112 5s., THE RECEIPTS FOR THE 20TH, 21ST, 22ND, 23RD, 24TH, AND 25TH WEEKS OF COLLECTION, ENDING APRIL 3RD, WERE: WEEKLY COLLECTIONS (SIX WEEKS), £193; PROCEEDS OF "D" DEPT. SOCIAL, £12. THE EXPENDITURE WAS AS

ORIGINATED BY M. André Michelin FOR THE BENEFIT OF OFFICERS AND MEN OF THE ROYAL NAVAL AIR-SERVICE AND THE ROYAL FLYING CORPS WHO ARE INCAPACITATED ON ACTIVE SERVICE, AND FOR THE WIDOWS AND DEPENDENTS OF THOSE WHO ARE KILLED.

THE FUND IS INTENDED FOR THE BENEFIT OF ALL RANKS, BUT ESPECIALLY FOR PETTY OFFICERS, NON-COMMISSIONED OFFICERS AND MEN.

IN VIEW OF THE GREAT UTILITY OF THE WORK OF THE FLYING SERVICES, EVIDENCE OF WHICH HAS BEEN REPEATEDLY GIVEN IN THE OFFICIAL DESPATCHES OF THE COMMANDER-IN-CHIEF, THE SKILFUL AND DARING FLIGHTS INTO ENEMY COUNTRY, AND THE PROTECTION AFFORDED BY THE CONTINUOUS PATROLLING OF OUR COAST BY AIRCRAFT, IT IS CONFIDENTLY EXPECTED THAT THE BRITISH PUBLIC WILL WELCOME THIS OPPORTUNITY OF SHOWING THEIR APPRECIATION BY SUBSCRIBING PROMPTLY AND LIBERALLY TO THE FUND.

THE RIGHT HON. LORD KINNAIRD HAS KINDLY CONSENTED TO ACT AS HONORARY TREASURER TO THE FUND.

SUBSCRIPTIONS SHOULD BE FORWARDED TO THE FLYING SERVICES FUND, THE ROYAL AERO CLUB, 166, PICCADILLY, LONDON, W., OR TO BARCLAY AND CO., LTD., 1, PALL MALL EAST, LONDON, S.W. CHEQUES SHOULD BE CROSSED "BARCLAY AND CO., LTD."

TULLIBARDINE, BRIG.-GENERAL,
Chairman of the Royal Aero Club.

	£ s. d.		£ s. d.
Total subscriptions received to April 7th, 1915...	7,803 16	Flight-Lieutenant John Dunville, R.N.A.S.	20 0 0
H. S. Wildeblood	2 0 0	Lady Tredegar (Second contribution)	20 0 0
Dr. Mayo	1 0 0	Piggott Bros. and Co.	
Per "W."	0 12 0	Ltd...	5 5 0
Collected by Miss A. F. Taylor	20 6 0	C. A. Birnstingl	0 5 0
William Harbrow	5 5 0	Eric H. Clift	5 0 0
Jack Humphreys	2 2 0	Total, April 14th,	
Miss Darlington	1 1 0	1915	7,886 12 2
166, Piccadilly, W.		B. STEVENSON, Assistant Secretary.	

DISTINGUISHED SERVICE ORDER IN RECOGNITION OF THEIR SERVICES AS MENTIONED :

"FOR SERVICES RENDERED IN THE AERIAL ATTACK ON DUNKIRK, JANUARY 23RD, 1915 :

Squadron Commander Richard Bell Davies.

Flight-Lieutenant Richard Edmund Charles Peirce.

These officers have repeatedly attacked the German submarine station at Ostend and Zeebrugge, being subjected on each occasion to heavy and accurate fire, their machines being frequently hit. In particular, on January 23rd, they each discharged eight bombs in an attack upon submarines alongside the mole at Zeebrugge, flying down to close range. At the outset of this flight Lieutenant Davies was severely wounded by a bullet in the thigh, but nevertheless he accomplished his task, handling his machine for an hour with great skill in spite of pain and loss of blood."

IN THE LIST OF AWARDS OF THE DISTINGUISHED SERVICE MEDAL NOTIFIED AT THE SAME TIME, THERE WAS THE FOLLOWING :—

"FOR GALLANT BEHAVIOUR ON RECONNAISSANCE IN A HYDROPLANE AT AKABA ABOUT JANUARY 6TH, 1915 :

Quartier-Maitre Hervé Grall, of the Aviation Marine Française."



FOLLOWS : R.F.C. Aid Fund, £38; Farnborough Court Hospital, £30; Connaught Hospital, £18; Cambridge Hospital, £18; Belgian Relief Fund, £17; Royal Surrey County Hospital, £12; Weekly Dispatch Tobacco Fund, £12; St. John's Ambulance Association, £8; Minley Military Hospital, £7; Serbian Relief Fund, £6; R.N.A.S. Comforts Fund, £3; relief of local cases of distress, £10 10s.; balance to Emergency Fund, £137 15s. 9d.

FROM THE BRITISH FLYING GROUNDS.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Sunday, last week, straights with instructor, Probationary Flight Sub-Lieuts. Coleman and Kerby. Instructors, Messrs. Winter and Russell.

Monday, straights, Probationary Flight Sub-Lieuts. Bone, Coleman, Jacobs, Kerby, Potts, and Wain. Solo straights, Probationary Flight Sub-Lieuts. Jacobs and Wain. Circuits and eights, Probationary Flight Sub-Lieuts. Jackson and Mack. Instructors, Messrs. Manton, Russell, and Winter.

Tuesday, first *brevet* test, Probationary Flight Sub-Lieut. Mack.

Wednesday, Thursday, and Friday, too windy for school work.

Saturday, straights with instructor, Probationary Flight Sub-Lieuts. Bone and Coleman. Final *brevet* test, Probationary Flight Sub-Lieut. Mack; Probationary Flight Sub-Lieut. Jackson also took *brevet* ticket, both in excellent style.

Beatty School.—The following pupils received instruction during last week:—Messrs. Allcock (32 mins.), Bond (10), Boyle (15), Bransby-Williams (10), Bright (25), Chapelle (15), Cooper (5), Cornish (5), Crowe (10), Fanning (10), Forbes (15), Fraser (25), Leong (25), Monfea (5), Moore (20), Roche (15), Fitzherbert (6), Watson (27). The instructors were Messrs. G. W. Beatty, W. Roche-Kelly and C. B. Prodger, the machines in use being Beatty-Wright dual-control and single-seater. Messrs. Boyle, Bransby-Williams, Moore, Watson, Yates and Fitzherbert continued extra practice. Mr. Forbes took his certificate on the 5th, and Mr. Roche-Kelly gave exhibition flights on the 5th, 9th and 10th, also a passenger flight.



Copyright, F. N. Birkett, from the F.N.B. Series of Aviators.
Mr. C. B. Prodger, one of the instructors at the Beatty School, Hendon.

Hall School.—During last week good work was got through. Lieut. J. Blyth 68 mins. on No. 1 tractor-biplane, doing good straights and half a dozen circuits. Mr. Hill 35 mins., showing excellent promise for a new pupil. Mr. Cini 26 mins., rolling in good style; both on No. 3 tractor. Mitchell 14 mins., improving rapidly, Ditto pupils making flights in charge of instructor: Messrs. Cook, Aire, Hill, Mitchell 25 mins. each. Lieut. Raymond Barker in full control on No. 3 tractor, making several straights. Instructor of the week, J. L. Hall. Lieut. J. Blyth now nearly ready for Aero Club certificate.

London and Provincial Aviation Co.—Monday, last week, Mr. Goodwin circles and eights, then took ticket in first-class style; time on machine, 2 hours 44 minutes.

Tuesday, Messrs. Crooke and W. D. Smiles rolling.

Wednesday, Thursday, Friday and Saturday too windy for school.

Sunday, Mr. Forbes extra practice. Mr. Lincoln straights. Messrs. Gould, Crooke, and W. D. Smiles rolling.

Ruffy-Baumann School.—On Monday last week, Out on 60 Caudron. On 45: Mr. Cole, rolling 24 mins., Mr. Haydon and Mr. King doing straights, each 24 mins.

Tuesday, on 45, Mr. Robaert doing straights, 12 mins. Saturday, Haydon doing straights on 45.

Sunday, on 60 Caudron with E. Baumann, Mr. Bell (10 mins.), Sykes (10 mins.). On 45, Mr. Jackson (20 mins.), Robaert (20), Bell (28), Cole (12), Sykes (12), King (8). Mr. Haydon doing circuits in good style, up for 24 mins. Instructors, E. Baumann and James Brothers.

Northern Aircraft Co., Ltd.

The Seaplane School, Windermere.—Flying last week on Monday, Friday, Saturday and Sunday; the week-end being especially good, work being possible from dawn to dark. Instructors: Messrs. W. Rowland Ding and C. L. Pashley. With instructor: Flight Lieut. Artheon, Lieut. Lindsay Bainbridge, L. R. Abel Smith, R. Buck, C. A. Barber, F. H. M. Macintyre, D. S. C. Macaskie, J. Lankester Parker, G. L. Railton, H. P. Reid, J. F. Ridgway. Mr. S. J. Sibley was doing excellent figures of eight, his landings being specially marked, Mr. R. Buck making good straights on the Avro, and J. Lankester Parker continued extra practice before taking up duties as instructor.

The following new students have joined or have been for first flights:—F. W. Roberts, L. R. Abel Smith and R. Seymour Benson. Mr. Rowland Ding gave a good exhibition in a high wind on Monday, and on Friday took the Avro up to 2,000 ft. A number of passengers have been carried during the week, including several Army officers. Machines in use:—N.A.C. Avro dual control, N.A.C. propeller biplane.

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The Flying Services Fund.

FROM the official notices of the Royal Aero Club on p. 263 it will be noticed that the donations to the Flying Services Fund are rapidly approaching £10,000. Although this is most satisfactory, there must be no slackening in effort, and it is hoped that those who have not yet sent along their subscription will remedy the deficiency at once. There should be no need to urge the special claims of this Fund, remembering the splendid work which is being rendered by both the Royal Naval Air Service and the Royal Flying Corps. Subscriptions should be sent to the Royal Aero Club, 166, Piccadilly, W.

EDDIES.

IT was a pity that the high wind prevailing on the first days of the Easter meeting at Hendon and a refractory engine on the Monday prevented the visitors from seeing the Grahame-White tractor showing her paces. Manton decided, very wisely, that in view of his short experience on so fast a machine it would have been unwise to try her out in such a vicious wind. He got her going for a couple of flights, and then the

the report from the London and Provincial Aviation Co. that one of their pupils, Lieut. C. O. Fairbairn obtained his ticket after 95 minutes in the machine, of which 57 minutes were spent in the air, the rest being in rolling practice. Lieut. Fairbairn passed his tests on the morning of Good Friday, and I am told by his instructors that he has already joined up with the R.F.C.

x x x

We have received a very cheery letter and the accompanying photographs from Sergeant Aviateur L. Noel, who is at present in Paris. Noel speaks very highly of the new Nieuport biplane, of which we published some illustrations a short time ago. He expects to get one of these machines in a month's time, and expresses the hope that he will be sent to the East. Both Noel and Capitaine Watt are in the best of health, and wish to be remembered to their many friends on this side.

x x x

engine decided, it being a Bank Holiday, to take a rest. So it came about that Manton had to abandon his intention of giving a demonstration of speed flying for the benefit of the crowd of visitors which had gathered in the afternoon. It is, however, only an attraction postponed, and I shall look forward to her proper *début* at the next meeting of the season.

x x x

It looks as if the battle of the record for quick tuition is getting down to grips. Following the record claimed by the Hall School for Mr. Lloyd Williams with a time of 112 minutes, as noted in "Eddies" at the time, comes



Sergt. Louis Noel "*en garde*" with one of the heavy batteries.

Although not possessing topical value, having occurred some time ago, a short *résumé* of one of the experiences of the French pilot Gilbert should be of interest. It was in the vicinity of Amiens that Gilbert and his mechanic Bayle were detailed to attack a number of German aeroplanes which were on their way to drop bombs on Amiens. After reaching a height of 2,500 metres in



A souvenir de la guerre received from Sergt. Louis Noel. The gun is one of the famous 75's.



their Morane monoplane, they encountered three Albatros biplanes, which are said to have speedily turned tail on seeing the Morane. Gilbert and his mechanic singled out one, and started in pursuit. They soon overhauled the slower German machine, and at times were flying only fifteen metres apart. Although the hostile aviators were armed with a machine gun, and Bayle only with a cavalry rifle, the Germans seemed distressed, and were constantly dodging about in an endeavour to escape. On one occasion the Albatros dived under the Morane at a distance of a couple of metres only. Bayle says that he thought the Germans intended to ram them, but realising that this was not the case he got in a couple of shots with his rifle. The chase had, unfortunately, to be given up at Montdidier owing to lack of ammunition. On their return to the French lines Gilbert and Bayle, upon examining their machine, found that one bullet had pierced the wing above their heads, while another had first gone through the reserve petrol tank and then through a tool chest in which, amongst other things, were some picture post-cards belonging to Gilbert. The mechanic, who during the pursuit had taken off his gloves in order to be able to handle his rifle better, had his hands so frostbitten, the temperature being 16 degrees below zero,

THE SCREW PROPELLER.*

By F. W. LANCHESTER, M.Inst.C.E.

Introduction.

1. It can hardly be said that in the past the theory of the screw propeller has been established on an altogether satisfactory footing. The more general theory of propulsion as laid down by Rankine and the late Mr. W. Froude, although admittedly incomplete, is in effect one of the most successful of the applications of the Newtonian theory,† and may be regarded as practically sufficient; when, however, we pass from the general theory to the *implement of propulsion*, the screw propeller, the outcome of the early attempts cannot be regarded as conclusive in any respect.

Mr. W. Froude introduced into his treatment of the subject the notion of regarding the blade as made up of a number of annular elements. So long as this idea is not pushed too far it is of the greatest utility, and may be said to have taken a permanent place in propeller theory; certain restrictions, however, are necessary.

The author's method of treatment, as set forth in his "Aerial Flight," (Vol. I., Chap. IX.), is founded on the theory of sustentation and of the aerofoil developed earlier in the same work. In it the Froude conception of the blade as the sum of its annular elements is adopted, but the component elements are given, as to their pressure reaction values, &c., the benefit of the aspect ratio of the blade as a whole. The theory is developed in respect only of the condition of highest efficiency, or *optimum* condition, and is carried to the extent of being made the basis of an actual design. The investigation in question and the rules and procedure laid down by the author have been followed and worked to at the Royal Aircraft Factory with a very fair measure of success, the utility of the method being fully admitted. In the present paper the author goes far beyond anything attempted in the original investigation and deals with the propeller more generally, under other than the *optimum* condition; also as a special case (in Part I), a theoretical solution is given to the problem of the stationary screw or "helicopter."

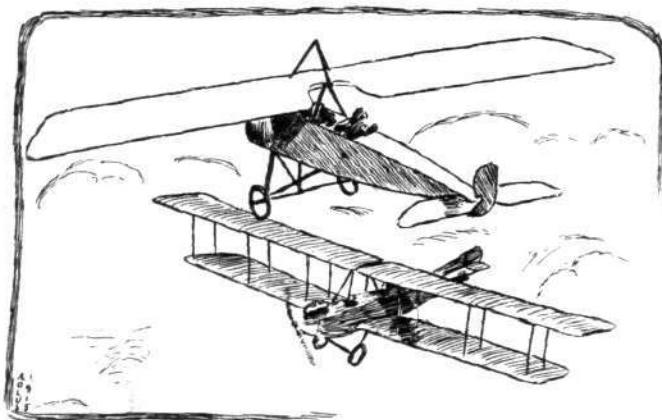
To some extent the results of a recent paper by the author, "A Contribution to the Theory of Propulsion and the Screw Propeller" (Inst. Naval Architects), are utilised; though mainly this is the case in respect to the "helicopter" problem. In dealing broadly with the screw propeller, the author has adopted a result given in an earlier paper by Dr. R. E. Froude,‡ in which it is shown that, in the case of a propelling instrument of a purely hypothetical kind, one-half the acceleration must take place in front of the propeller and the other half behind it. This result undoubtedly applies in some degree in the case of a screw propeller, but *how much* before the medial plane of the propeller is reached and *how much* after we do not exactly know. It being necessary in the investigation (Part III) to assume something, Dr. Froude's result has been taken

* A Paper read before the Institution of Automobile Engineers, April 14th, 1915.

† The theory of the hypothetical medium of Newton.

‡ "On the Part played in Propulsion by Differences of Fluid Pressure," Proc. Inst. Naval Architects, 1889.

that he had to go to hospital. He is now in flying trim once again, and none the worse for his adventure, whilst amongst his dearest souvenirs is one of the picture post-



cards pierced by a German bullet and bearing the following inscription by Gilbert: "A mon vieil ami Bayle, à mon dévoué mechanicien, en souvenir de notre chasse à l'Albatros du 18 Novembre, 1914, à Amiens."

"ÆOLUS."

THE SCREW PROPELLER.*

as it stands. It will be noted, however, that the author's treatment admits of any other or better ascertained result being adopted; a few forms of algebraic expression only will need modification, and the arithmetical results will need correcting accordingly—the method is quite elastic.

2. The author takes the present opportunity of pointing out a difference between his present and former treatment which is of some moment. In his "Aerial Flight" (Vol. I.) the theory of sustentation and of the aerofoil in which the propeller theory is founded is based to a certain (and essential) degree on the experimental results at that time available, mainly the work of Dines and Langley; in the present investigation *the whole of this is discarded*, and in its place (in spite of all the wind channel work that has since been done), the author has elected to use a purely theoretical conception of the nature of the fluid motion. This is as set forth in the paper on "The Aerofoil" read last month before this Institution; it is a definite fact that the results given by experiment are, so far as relevant to the present subject, considerably less reliable than those which may be deduced from the most elementary theoretical considerations. The form of treatment adopted is, however, such that when this state of affairs is reversed, as in due course it may be, it will be merely necessary to substitute a curve plotted from experiment for one calculated from theory, in the graphic portion of the work to bring things up to date.

It may be briefly stated here that the author's recent paper gives an account of a theory of dynamic support founded directly on vortex motion. It is shown that the aerofoil gives rise to a vortex pair or system in its wake, and that the supporting reaction, the resistance, and (approximately) the sectional form may all be correctly deduced as related to the said vortex system. Beyond this it is shown that the vortex system commonly generated by an aerofoil of approximately uniform camber is very closely that which would be set up in a two-dimensional region by the movement of a plane (or line, if strictly in two dimensions) through a very short distance by an impulsive or nearly impulsive force; this happens luckily to be a form which has been studied and solved by the mathematician, and the streamline system is that given in Fig. 1. The two-dimensional region is presumed to lie "athwart stream," and the width of the plane in Fig. 1 corresponds to the effective span of the aerofoil; it has to be assumed that the plane be withdrawn immediately the impulsive force has set the fluid in motion. The two-dimensional treatment would not be legitimate were it not for the fact that the vortex is shown to comprise a cyclic component around the aerofoil itself. The subject at the best is not in theory the easiest to understand, and in any case some knowledge of the hydrodynamics of mathematical theory must be presumed, otherwise the facts must be taken on trust.§

§ Reference should be made to the paper cited for a fuller exposition; also to the author's "Aerial Flight," Vol. I. For the study of the mathematical treatment of hydrodynamics and vortex motion, either Lamb or Basset may be recommended.

In the present connection the most important fact to be accepted (whether taken on trust or otherwise), is that the vortex motion may be represented by a dynamic substitute in the form of a

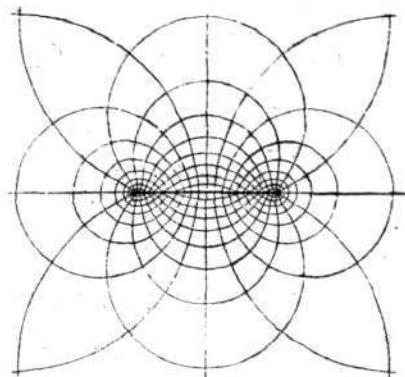


Fig. 1.

cylindrical body of the fluid of circular section, whose diameter is equal to the span of the aerofoil, or in the case of the propeller equal to the effective length of the blades.

We may obtain a graphic idea of what this means by reference to Fig. 2; here we see a blade arranged diametrically across the mouth of a slightly bent pipe; the blade represents the aerofoil, the pipe represents the measure of the column of air that it controls. Now we know that the question of skin-friction or surface

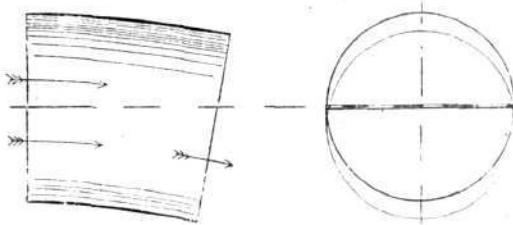


Fig. 2.

resistance is one of vital importance in flight; the only real advantage in fact of a foil of high aspect ratio over one of low is due to the reduction of surface; hence, we are in a position to appreciate the enormous importance of the cyclic component in the periphery, and the positive and ludicrous futility of the many schemes proposed from time to time to utilise pipes or scoops in place of the simple aerofoil or propeller blade. Such suggestions are not unlike those of the patentee of years gone by who wanted to pipe electric current through a tube so that less of it should be lost.

The circular form of the periperal "cylinder" is, it is true, due to the particular character of the impulse distribution assumed as basis; at present there is not much choice in this respect owing to the backwardness of the mathematician, but when attention is focussed on the point doubtless other solutions will be found; the author is at the present time attacking the problem by graphic methods. In any case, the particular solution in question does undoubtedly fit the actual conditions very closely. Beyond this, it is becoming evident that even when widely different types of impulse distribution are in question the difference in the periperal area equivalent is not so great as might be thought, thus it is not to be supposed that the result of assuming the circular cylinder as the vortex equivalent will be seriously in error.

3. When we apply the same concept to the case of the propeller we have each blade in its spiral path forming the diameter of a circle, its periperal area, whose trace in space defines the equivalent of the fluid coming in effect within its grasp; thus the whole region of the propeller stream must be considered as resembling a rope, whose number of strands is equal to the number of blades. The author finds this conception of the propeller race or stream one of considerable utility; it should be kept constantly in mind.

In the author's theory, vortex motion plays an important part in the determination of blade section. As in the case of the aerofoil the camber is dissected into two elements: the primary camber, which is related to the two-dimensional motion, that is the ultimate motion left in the fluid; and the secondary camber, which is considered as superposed on the primary and which is concerned with the cyclic motion about the foil itself. In effect this is precisely the same as the treatment given in the author's earlier work, "Aerial Flight," Vol. I., but there the division was not made, neither was it realised what assistance to the theory of the subject would result from the separation of the two functions. In connection

with the propeller theory as set forth in the present paper, the primary camber is that with which we are mainly concerned; the rôle of the secondary camber only becomes of interest when we come to the discussion of blade form. This is to some degree discussed in connection with the helicopter and again in Part IV of the paper, but it is a subject which, to do it justice, would need a paper entirely devoted to its consideration.

The blade section dealt with in the present theory is thus, generally speaking, that of the primary camber. It is, however, well to bear it constantly in mind that the actual blade is something quite different, although a dynamical equivalent.

The necessity of the cyclic or vortex theory becomes the more evident the closer we are acquainted with the propeller, and on any other basis the idea of the earlier workers in the problem of propulsion would have been perfectly sound; thus Fig. 3A would have been a perfectly correct and logical design. On the other hand, how would it be possible to justify the highly efficient propellers of the modern aeroplane (Fig. 3B), unless by an alternative assumption involving action-at-a-distance? Again, it is well known that the cores of the vortex pair left by each blade may become

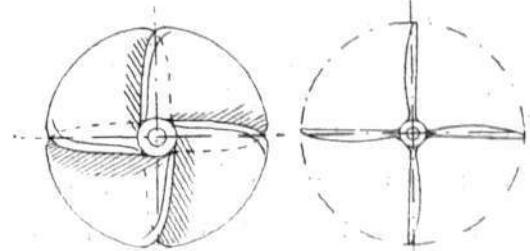


Fig. 3.

visible if a little air is introduced, as, for example, when the propeller of a steamship is not fully immersed.

4. In the present paper the symbols employed are those adopted in the author's previous work; notably his "Aerial Flight" and the recent papers read before the Institution of Naval Architects and this Institution. In the latter paper, however, the symbol θ was inadvertently used to denote the angle of trail of the primary camber of the aerofoil; as this symbol was used for the effective pitch angle of the propeller blade in the previous work, it is being retained in the present paper in its earlier usage, and the symbol η is adopted for the trail of the primary camber. Again, objection has been urged (perhaps with justification) to the use of the skin-friction coefficient as being expressed in terms of normal plane pressure in lieu of being expressed as a constant dealing direct with the quantities density and velocity squared, as is usual in other cases. This objection is most easily met by combining the coefficient with the normal plane constant, thus— ξC , it being understood that when these symbols occur thus in juxtaposition, the value of C shall be taken as 0.62.

As a matter of convenience the present paper is presented in four parts.
(To be continued.)



Fatalities in America.

WHILE doing "stunts" at Los Angeles on March 19th in connection with the making of a cinematograph film representing a battle in the air, Frank Stites lost control of his biplane, which fell to the ground from a height of 150 ft., the pilot being instantly killed.

A cable from Washington announces that Cecil Peoli was killed there on April 12th while testing a new armoured biplane, which he had built and submitted to the U.S. Army authorities.

Military Flyer Killed in Mexico.

LIEUT. GEORGE PUFLA, formerly an instructor at the Moisant school, was killed at Yucatan, Mexico, on March 18th, through one wing of his machine buckling up. He was engaged dropping bombs during the fighting in Yucatan, and fell from a height of 1,500 feet.

Fatal Accidents in Germany.

ACCORDING to information to hand from Geneva and Lausanne, two new German monoplanes, while being tested at Freiburg, Baden, were caught in a sudden squall and dashed to the ground, both the officer pilots being killed.

AIRCRAFT AND THE WAR.

A YOUNG Colonial, in a letter home, recently published in the *Times*, gave the following description of an aeroplane's visit to a camp in German S.W. Africa :—

"We were just marching away, about fifty of us from the Scottish, when the alarm was sounded near us by the look-out, and the cry 'A-a-e-er-ooplane' came floating down from another look-out on a hill some way off. The camp is very much spread out, I may tell you. Everybody, except those on fatigue, &c., has to be right out of camp from dawn to breakfast time, drilling, &c. Well, there was not time to get out of camp or reach the trenches on the outskirts, so we just had to shelter where we could. — got down beside the railway embankment, and I got between some half-buried water tanks. Mine was the better protection, unless a shell had fallen right into my hollow, but still I did not feel too happy, because the water tanks are the aviator's objective. I was pretty sure the two first bombs would miss us, but No. 3 was coming straight for my hollow till a few hundred feet off the ground. It is jolly hard to judge time in moments like these, but I should say the shells took half a minute to drop the 1,000 ft. I got down flat when the bomb was near the earth, and then with a terrific roar it burst, and a cloud of flame, black smoke, and dust rose outside my barrier of water tanks and sandbags. Bits of shell went whistling away overhead, and three telegraph wires were cut and dropped near me. I was certain the shell had burst just outside my barrier, and was surprised to find it had done so 40 yards away; we seem to live for years while the bombs are falling."

Mr. A. Beaumont, writing from Bale to the *Daily Telegraph* on the 6th inst., said :—

"On Easter Monday the guns were hardly heard in the Sundgau, but, instead, we had an exciting aerial battle, which ended in the landing of two French aviators on this side of the Swiss border, and their capture by the Swiss authorities.

"Early yesterday morning four French aeroplanes were seen coming over the Vosges. They headed for the Rhine valley, and were immediately pursued by several German aeroplanes. The Frenchmen boldly crossed the Rhine, and then steered northward over Mülheim and Neuenburg, where they circled defiantly over the stations and barracks, which opened fire. Then they flew back towards Colmar and Mülhausen, dropping a number of bombs on the German troops and batteries *en route*. Next they were seen leisurely following trains on the line to Mülhausen, greeted all along by the discharge of machine-guns and fire from hidden batteries. The heaviest fire directed on them came from a height outside Mülhausen, known as 'the Rebberg,' but they escaped, and dropped two bombs on the railway station of Napoleoninsel, which demolished the rails. Their appearance caused tremendous excitement in Mülhausen, the inhabitants of which place disobeyed the official instructions, and, instead of hiding in cellars, flocked by thousands into the streets to watch the flyers. The French aviators all this time were being pursued by German aeroplanes, which they dodged successfully. Finally, they flew away in the direction of Schlettstadt, and dropped bombs on the railway station at Markirch, where many troop trains happened to be stationed. As they crossed the Vosges the Germans gave up the pursuit.

"Towards the evening a fresh squadron of four French aviators appeared, and could be seen distinctly from the Swiss border, where I watched them myself from the summit of the Blauen, a peak close to the frontier, between 6 and 7 p.m. They were flying in the direction of Illfurt, when suddenly five or six German aeroplanes appeared from over Tüllingen, and started a chase, which became a thrilling one. The French aviators flew higher and higher, and for a while disappeared from view. At 6.45 p.m., while I was still on the summit of the Blauen, a French biplane reappeared over the Larg Valley, having evidently escaped the German pursuit. This aeroplane mistook the territory, and instead of landing within the French boundary it came down at Porrentruy. Almost at the same time a pursuing German aeroplane was seen coming from Altkirch, but when it saw that the Frenchman had landed in Swiss territory it turned round and flew back.

"The two French aviators who had safely landed were surprised to find themselves on Swiss soil. The pilot and the observing officer were taken to the Town Hall before Swiss officers, who questioned them, and finally informed them that they would be interned. Then they were taken to the Hotel White Horse for the night, and, I believe, have already left this morning for Berne."

The following message from its correspondent at Eccloo was published by the *Telegraaf* on the 6th inst. :—

"The Allies' airmen are once again showing much activity; after having bombarded certain works at Bruges and the German aviation field at Ghentelles, they have now inflicted damage in the districts of Lassen and Cortemarck, at the place where the Thourout-Ostend main railway line crosses the Ghent-Dixmude track."

A *Daily Mail* correspondent at Copenhagen, writing on the 7th inst., said :—

"Several German submarines which had taken refuge behind the Norwegian cliffs at Bergen Bay were discovered by Norwegian military airmen, who ordered the submarines to leave the neutral zone immediately, and said that if they did not they would be interned."

Writing to the *Daily Telegraph* on April 8th, Mr. A. Beaumont said :—

"The interest of the Swiss military authorities in the operations has been increased by the fact that at no time since the beginning of the war have the French aviators from the Belfort district shown such activity as during the last few weeks. As I already informed you, they even pushed their excursions over the Schwarzwald and into the Duchy of Baden, with a view of ascertaining day by day the reinforcements that are being prepared on the other side of the Rhine to be sent into Alsace. The towns of Mülheim and Neuenburg, which I have already mentioned several times, received the day before yesterday the visits of no fewer than seven French aviators, two of whom threw bombs on the railway station and barracks which lie between the two towns.

"Mülhausen also continues to be visited daily by tricolour aeroplanes, but the pilots abstain from dropping any bombs on the town. The visit of the French aviators causes such excitement each time in that town that, in spite of the strictest orders of the authorities, the inhabitants on these occasions, instead of taking refuge in the cellars, assemble in the streets and look on with friendly demonstrations of sympathy. The aviators in flying over it look upon it evidently as a friendly town, and sometimes drop the latest papers from Paris, which, of course, it is treason for the people to pick up. But the papers are snatched up and read all the same. In spite of the fact that the French aviators have been continually under gun and rifle fire from a score of military centres almost daily for the last month, they have escaped unscathed, and not one of them has been disabled."

The *Morning Post* correspondent in Paris, writing on April 8th, said :—

"The main effect produced by the Zeppelin raid on Paris has been a general reduction of the lighting of the town. Experiments are still being carried out; more and more lights are extinguished every night, and aviators regularly look down and report upon the appearance of a city which is scarcely more lighted than the average town of the Middle Ages. In normal times the 'Ville Lumière,' which is certainly one of the worst-lighted capitals in Europe, has 55,000 gas and electric lamps in working order. At present only 16,000 of them are allowed to shed a fitful light on the melancholy streets until ten, and after that hour they are reduced to 5,500. If a Zeppelin is announced there will be no need for any further reduction of the lighting until it is practically over the town, when almost all lights will be extinguished.

"It is announced that these precautions are intended to prevent a German airship from sighting the lights of Paris at an enormous distance, but the general impression is that their real purpose is to persuade Parisians that a Zeppelin raid is a thing to be taken seriously and not merely an entertaining spectacle, which justifies everyone crowding immediately to the most exposed point of observation attainable. At the moment of the last Zeppelin raid crowds flocked to the top of Montmartre and the steps of the Sacré Coeur, bent on enjoying to the full the pleasant excitement of seeing a Zeppelin fired at with real shells and dropping real bombs."

The *Daily Telegraph* correspondent at Rotterdam wrote on the 9th as follows :—

"According to a frontier correspondent, English airmen last night made a raid upon the German defensive works in the vicinity of Zeebrugge. At about nine o'clock bombs were dropped at Heyst and Knocke, the object of the attack being to destroy the defensive works in those places. As yet no news of the damage caused by the bombs is known."

The *Telegraaf* on Saturday printed the following message from its Sluis correspondent :—

"Almost daily German aeroplanes are reconnoitring. One was

shot down by the Belgians near Pervyse; both the officer occupants were killed, and the aeroplane was burnt up. The Allied aviators are also very active. At Aerseele, near Thielt, another Taube was brought down.

"A Zeppelin last Thursday was seen over Thielt."

A Central News message from Bale on Sunday evening said:—

"On Thursday evening, although a storm was raging, 13 French aeroplanes dropped bombs on the railway station and repair sheds at Habsheim. The raiders were pursued by a squadron of Taubes, but dropped three more bombs on the windmill of Dietwiller."

The *Times* correspondent at Mitylene reported the following on April 12th:—

"An Italian resident in Smyrna, who has just arrived here, describes the performance of an airman who flew over the town on the morning and again on the afternoon of the 4th inst. as an awesome and thrilling spectacle. For over an hour in the morning he circled above the forts and town defying the storm of shrapnel and bullets with which he was continuously assailed, descending at times to an altitude of less than 500 yards and performing the most intricate and graceful evolutions. The afternoon performance was a repetition of that of the morning. Thanks to his snipe-like movements he got away unscathed, after giving the people of Smyrna, who assembled on the quays, open spaces and terraces, some unusual emotions."

The following details regarding the recent Zeppelin raid on Nancy were received in Paris on Monday:—

"Shortly after 1 a.m. on April 12th, the people were awakened by two loud explosions, and the thrum of the airship motors was distinctly heard. The sky was streaked with searchlights, and a vigorous fire was opened against the enemy, who hastily withdrew to the frontier."

"Fortunately, nobody was killed or injured, though a paint and varnish factory were set ablaze by an incendiary bomb, the damage done being estimated at £4,000. In two other places fires were quickly extinguished, in one case mainly thanks to the presence of mind and pluck of a foreman, who seized a still burning bomb by the handle and placed it in water."

The *Telegraaf* on Monday reported:—

"British airmen coming from the sea yesterday morning flew to



Austrian Bombs on Montenegro.

SIR J. ROPER PARKINGTON, Consul-General for Montenegro, received the following official telegram from Cettinje on the 9th inst.:—

"The Austrians have again been busy with wanton attacks on undefended towns. About half-past four on Thursday an aeroplane passed over Cattaro, and seven bombs were thrown on the market place at Podgoritza, killing or wounding seventy-two women and children. One poor wounded woman gave birth to a dead child before she could be removed to hospital. These repeated attacks on the women and children of entirely unfortified towns cause the most intense anger and indignation throughout Montenegro, especially as no military purpose whatever is served."

This was supplemented by the following official telegram from Cettinje:—

"The King, accompanied by the Crown Prince, on Saturday visited the victims of the Austrian aeroplane attack on Podgoritza. Unfortunately the number of sufferers is much larger than at first anticipated."

"Up to Friday 109 wounded and twenty-eight dead have been discovered, many of the latter so shattered as to be unrecognisable."

Honours for French Army Flyers.

ACCORDING to a message from Paris the Academy of Sports has decided, in conformity with the suggestions of the Ministry of War, on the advice of General Joffre, to award its Grand Prix to the *Aviation Militaire* in recognition of the heroic services rendered by it to the national defence. The message adds that families of

Bruges, where it is reported they dropped bombs on the railway line."

From its Antwerp correspondent the *Telegraaf*, the next day, received the following information:—

"Since the second air attack on Antwerp the German vigilance has increased, and observation posts have been placed in several parts of the town as well as at Hoboken. As the first English attack was made with a captured Taube, the German authorities have taken precautionary measures. Airmen regularly leaving the flying ground at Wilryk are now giving signals with coloured fire arrows. The second air attack completely surprised the Germans. On April 1st, at six o'clock in the morning, a biplane suddenly emerged from the clouds, dropping two bombs in a courtyard at Hoboken before anybody noticed the airmen, who probably intended to visit the Hotel Rheinischerhof, where numerous German officers were living."

The following message was sent by the *Morning Post* correspondent at Amsterdam on April 13th:—

"This morning a German biplane was seen over the islands of Walcheren and Zuidbeveland, in the province of Zealand. When above Middelburg the biplane dropped a tin containing some papers. Soldiers of the military guard fired at the biplane, which returned and descended near Goes, the aviator, one an officer, being interned. The tin was found, but the documents had apparently been blown away."

"A Zeppelin was seen yesterday near the island of Ameland going westward at a quarter past eight. The same evening a second Zeppelin was seen near the same island, also proceeding in a westerly direction."

In the "Wireless" news sent out from Berlin on Tuesday there was the following:—

"In the Western theatre of the war the French assert that they dropped 150 bombs on the railway station near the beach in Ostende and the foundry in Bruges. As a matter of fact, nine bombs fell in the neighbourhood of Ostende, and two at Bruges, without doing any damage."

"In return, we dropped numerous bombs during last night on the villages of Popperinge, Hazebrouk, and Kassel, which are occupied by the English."

"An attack by enemy aviators in the region east of Rheims failed."



dead and missing aviators will share £400 of the Deutsch Grand Prix.

Heavy German Casualties.

In the latest casualty lists published by the Prussian War Office are included the names of seven aviators who have been killed, as well as nine wounded and eight missing, while it is mentioned that two Saxon and one Bavarian officers attached to the Flying Corps are missing.

Precautions at Friedrichshafen.

A MESSAGE from Lausanne on Saturday last stated that the German authorities had suspended traffic on Lake Constance for a grand rehearsal of the measures which are being adopted to prevent another raid on the Zeppelin works at Friedrichshafen. Included in the arrangement are thirty motor boats, armed with anti-aircraft guns, which have been brought from Steetin.

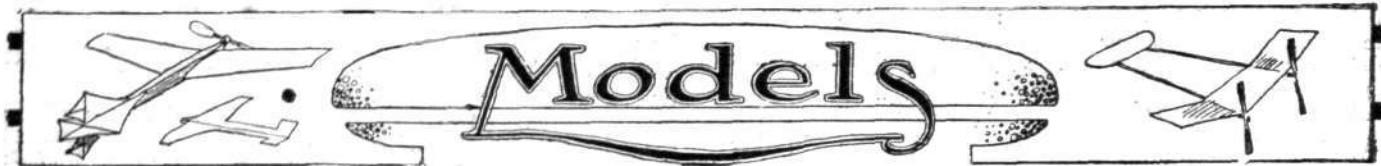
German Machines for Turkey.

THE *Messaggero* recently received the following telegram from Dedra Gatch:—

"Since March the Germans have supplied a squadron of Taubes to Turkey. These are the machines which have recently been carrying out reconnaissances above the Dardanelles and the Bosphorus."

Dutch Bring Down an Aeroplane.

ACCORDING to the *Telegraaf*, a biplane flew over the district of Goes on Monday morning. Dutch troops were called out at once, and firing on the aeroplane forced it to descend near Goes. Two officer occupants were arrested, and will be interned. The machine was seized.



Models

Edited by V. E. JOHNSON, M.A.

Wireless Controlled Models.

"I HAVE read your article," writes Mr. J. C. Balden (Hon. Sec. Scottish Aero Soc. Model Aero Club), "entitled 'The possibilities of an Aerial Torpedo controlled by Wireless' with great interest as the possibilities of controlling a model aeroplane by wireless has been in my mind for some time past. I am certain that until such control is obtained the fullest use that the model may be put to by the full-sized constructor will not be obtained.

"Take, for example, a model whose engine is capable of running steady for a quarter of an hour, and whose flight you have full control of, climbing, *vol plané*, turning right and left, &c., by merely pressing a button; then, indeed, models would be of very great value. These evolutions would, however, be carried out in a fixed order. One may, however, say that the difficulties are far too great, but with the exception of finding a light suitable motor, and the tuning up of the coherer when at a distance up in the air from the operator, I think the other difficulties would be easily overcome. It is a proposition to which aeromodellists should give their attention, as in its successful solution there lies great possibilities. I intend when the war is over making experiments regarding the wireless part, and as to the motive power, I should be glad if you could give me any particulars of any motor, steam, petrol, &c., you think suitable for the above requirements."

Referring to our correspondent's communication the successful application of "wireless" to the control of model aeroplanes is, we feel sure, very largely one of co-operation.

There are at present scattered over the country a number of model aeroplane clubs, very few of whose members (probably) know anything about "wireless," there are also quite a considerable number of "wireless" clubs in the kingdom, some, at any rate, of quite an advanced character, but these members know nothing of model aeroplanes. Unfortunately nearly, if not all, their attention has been devoted to wireless telegraphy, with crystal detectors, &c., and in which a coherer now plays practically no part. The first thing to be done, at least so it appears to the writer, is to bring these two bodies in touch. The wireless people probably would not become aeromodellists, although a few, of course, might; but their knowledge of wireless work would undoubtedly be useful to any aeromodellist contemplating experimenting in this direction. There is still a third class of model workers who could well contribute their share, and that is model motor boat enthusiasts, of whom there are quite a considerable number. As a matter of fact, such are badly in need of a successful method of keeping their craft straight, i.e., of being able to steer them automatically. At present they run round and round a pole on the end of a string and run not against one another, but against time.

A successful method of automatically steering sailing model yachts appears to be in use.

We have brought the model motor boat worker into the question because we are quite sure the solution of the problem will be a very gradual one, and that it should be approached through and by the model motor boat. Let us first of all learn to steer or control a model motor boat successfully by means of wireless before attempting to apply it to model aeroplanes. In S. R. Bolton's "Wireless Telegraphy," Whittaker and Co., 2s. 6d., pp. 54, 55, 56, the reader will find an account of Nikola Tesla's wireless-controlled boat. In "Wireless Telegraphy," Cassell and Co., 1s.; "Work" Handbook, pp. 142-143, there is an account of a tuned coherer. An account of the "Natalia" is sure to be given in the "Scientific American," which can be seen at the Patent Office Library and elsewhere. Whether any technical account has as yet appeared of the small wireless dirigible exhibited at the London Hippodrome, and later, we believe, at Maskelyne and Devant's, we do not know. If so perhaps some reader will kindly supply the information. The question of the motor can well be left over for the present.

In the Nico'a Tesla boat the relay magnet was used to control the operation of the propelling engine and of the steering apparatus. Placed in the circuit of the electric controller was a commutator, by means of which the direction of the current may be changed in order to influence one of the two relay magnets placed in the battery circuit. While one relay is in operation, its armature closes a circuit passing through the motor in order to cause the rudder to swing to port, the other relay causes the motor to throw the rudder to starboard. There can be no doubt that the problem must be first

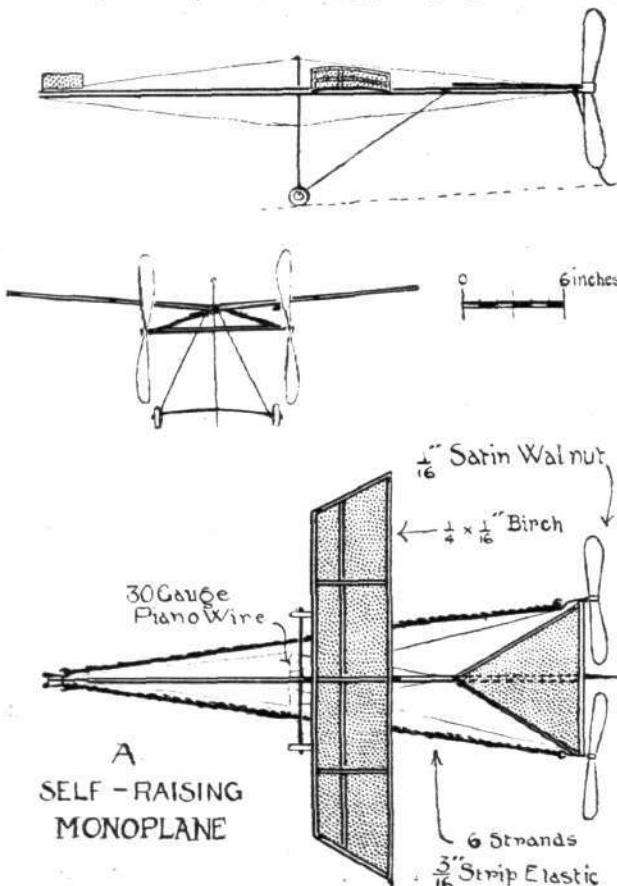
attacked by experimenting with a model power-driven boat; the simplest and easiest point of attack is the stopping and starting of the electric motor by which the boat is driven, then the steering of the same, and next a petrol or steam-driven model and a careful study of how far the vibrations of the engine affect the coherer.

We shall be glad to hear further from our readers on this all-important question; without a doubt, the future status of models will be vastly affected by it.

My 50th Model. By H. TOMLINSON.

"I herewith send you drawings of a canard or pusher type r.o.g. model which has proved itself a very consistent flier. It is my 50th model, all made since January, 1914; this is not counting non-fliers, of which I have had a few.

"I see you published my last drawings under the name of 'Mr.' Tomlinson; this is my fault, as I only put my signature; my age is



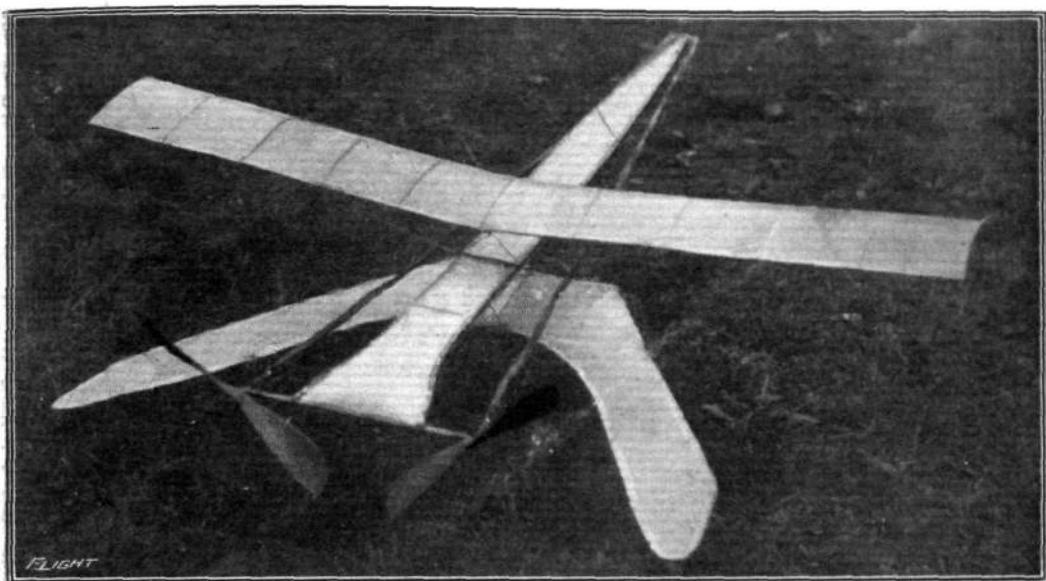
15, so I am hardly a 'Mr.' yet. I hope to send some photographs soon, if of any use to you." [The building of 50 models ought to produce something in the nature of model development; any photographs, &c., showing this would be interesting.]

Club Histories.

"I am glad to hear re FLIGHT," writes Mr. G. H. Kilshaw (Hon. Sec. Liverpool Aero. Research Club), "about club histories and suggested compilation of same. It would be practically impossible to give particulars of every model flown at club meetings, but I should suggest particulars and photographs, sketches, &c., of winning competition machines.

"I have practically the complete list of models constructed by myself since the club's commencement, with a few experiments, &c., but the matter is one which would take some time to edit; I would, however, let you have them if you would care for me to do so."

We shall be pleased to receive these; we may perhaps just once more state that every account, whether of a personal or club nature, should be in proper chronological order and dated as accurately as possible. Where one type of model has been given up in favour of some other type, it would undoubtedly be interesting to know, in some cases, the reasons for this.



Single surface model by W. Rogers of the Windsor Aero Club. This has scored a duration of 58 seconds.

Mr. O. Hamilton, Jun. (Hon. Sec. Stony Stratford Model Aero Club), also writes: "With reference to Mr. Camm's suggestion re the history of model aero clubs and the contributions of Mr. W. E. Evans and the South-Western Aero Club; if I may express an opinion, I feel that such a step is one in the right direction, both for the consolidation of model clubs and for the more co-operative working towards a general idea of model development. Personally, although at present my hands are rather full, I think that I could collect information to write up our modest records in the model world."

"I am placing the matter before my members in order to collect as much rational details as possible. The idea of including a sketch of the most regular flying models is certainly one that commends itself to me, as such would be a good criterion of progress actually accomplished."

Model Aeronautics in America.

We have received from Mr. W. P. Dean a copy of the *Model Aero*, Vol. 3, No. 1, January, 1915, which contains, amongst other matter referred to, a very useful article on Bentwood Propellers by Mr. Dean, reproduced below. Amongst interesting items contained in the paper, the following should be especially interesting to readers of FLIGHT:—

"Plans are now in progress for a series of contests to be held for prizes offered by the Aeronautical Society, consisting of three yearly memberships to the Society. It is understood that these contests will be for models of the scientific type. As has been previously stated, the aim of this organisation is to study aviation



New Ranks in R.F.C.

By a Royal Warrant published on the 8th inst., as an Army Order, the following additional ranks in the Military Wing of the Royal Flying Corps are constituted, with the daily rate of pay assigned to them, including flying pay:—Wing Commander, 38s.; Wing Adjutant, 27s.; Equipment Officer, 24s. 6d.

Officers are to be appointed to be Assistant Equipment Officers, and are to receive, according to their classification by the Army Council, either the ordinary rate of pay, without flying pay, provided for a Flying Officer, or the rate provided for a Quartermaster. They are to receive in addition flying pay at the rate of 5s. a day for each day of ascent. The following additional grades of non-commissioned officers are to be provided: Technical Quartermaster-Sergeant, with a daily rate of pay of 10s.; Non-Technical Quartermaster-Sergeant, 4s. 6d. In these cases flying pay is not admissible in addition.

A New Non-Poisonous Dope.

FROM an announcement elsewhere in this issue it will be seen that Messrs. Siebe, Gorman and Co., of 187, Westminster Bridge Road, London, S.W., the makers of "Novadope," are putting on the market a new aeroplane dope—"Novellon." Among the advantages

scientifically, and this cannot be done by the ordinary racing model, and for this reason 'scientific' models will be used in these coming contests, details of which will be published later."

It will be extremely interesting to know what these details are and to see what our friends in the state designate a "scientific" model.

"At a recent meeting, Mr. F. Schober and Mr. R. Funk demonstrated the compressed air motor constructed by them, and proved its ability to do all they intended it should."

"Two other members (Aero Science Club), in order to decide as to whether a model is more efficient when provided with negative tips, are building models of the same size and weight, and both will use the same power. The model proving the best all-round flyer will be adjudged to have decided the question."

The sec. of the club is Mr. Harry Schultz (model editor of *Aeronautics*, U.S.A.), 29 West 39th Street, New York City, New York, with whom some of our readers would perhaps like to communicate.

"One young model enthusiast has attached a parachute dropping device to his model which enables the parachute to be dropped at any predetermined time."

"Five members of the Illinois Model Aero Club have started the construction of compressed air motors, and they hope to establish some new records in that line."

"The Model Aero Club of Oxford [Pa.] makes the claim that one of their members has broken the club duration r.o.g. record with a flight of 141 secs."



claimed for the new dope, which, by the way, is of British manufacture, may be noted: It does not contain any ingredient injurious to health, and is entirely free from tetrachlorethane, while we understand that finishing varnishes are not required with this preparation.

A Change of Name.

In future the aeroplane motor made by the Sunbeam Motor Car Co., Ltd., of Wolverhampton, which is giving such excellent results in actual service, will be known as the Sunbeam-Coatalen aircraft motor.

Sopwith Co.'s Telephones.

In order to avoid the confusion which arises from having several numbers, the telephone lines of the Sopwith Aviation Company, Ltd., at their works at Kingston-on-Thames, have now been rearranged, and the call in future will be "Kingston 774" (3 lines).

Lantern Slides for Military Lectures.

THE Grahame-White Aviation Co., Ltd., announce that they have some excellent sets of aviation lantern slides, including subjects of up-to-date machines, which they would be pleased to loan for lectures to officers only, free of charge. Applications should be made to the Hendon Aerodrome Offices, 32, Regent Street, Piccadilly Circus, W.



An all-important "Accessory" in Aviation—Dope.—A consignment of Cellon dope leaving the Company's works for the Admiralty, on account of a contract.

Dirigibles for U.S. Navy.

FOLLOWING its proposals with regard to the acquisition of seaplanes, the U.S. Navy has asked for bids for two dirigibles, which are to be of the non-rigid type, not to exceed 175 ft. in length, 50 ft. high, and 35 ft. wide, and to carry a useful load of 2,000 lbs. or more. With a full load the airships must be capable of rising to 3,000 ft. without disposing of ballast, and to descend at the rate of at least 6 ft. per second from that altitude without danger of buckling. They must have a speed of 25 miles per hour or more, and be capable of running for two hours or more at full speed. They must be provided with at least two balloonets, with means of trimming, by the use of same, to act in conjunction with pitching controls. At least one ripping panel at each end must be fitted. The cars must accommodate a crew of eight within a closed body, and be of such form and sufficient buoyancy to allow of resting on the water or of moving through the same at slow speeds. The vessels must be fitted with substantial and secure means for mooring by the nose to a mooring mast in a wind 50 per cent. greater than the speed. All control leads must be double—one cable, one wire. The gas leakage must not exceed 1 per cent. in 24 hours when stowed in shed under normal conditions.

The dirigibles are to be delivered at the Naval Aeronautical Station, Pensacola, Florida, and after being inflated with hydrogen gas the following trials will be carried out:—

Full speed trials with the equivalent of full load in place—five runs over a measured course. *Climb*—starting from the surface of the water. *Descent*—to at once descend to the surface at or exceeding the rate specified. *Endurance*—to fly in a closed circuit for at least two hours at full speed. *Manoeuvring*—to maintain a reasonably true course across a 15-mile puffy wind, and in a 15-mile wind the dirigible shall be brought to and moored at the mooring mast. Test for leakage.

No Dirigibles for U.S. Army.

APPARENTLY dirigible work in the United States, as in Great Britain, is to be the province of the Navy, as Brigadier-General George P. Scriven, chief of the Army Aeronautical Bureau, has stated that the U.S. Army will not experiment this year with dirigibles. General

Scriven says that he does not see any reason for the States to expend a large sum in building airships, as they have not proved of value for military purposes in the European war.



IMPORTS AND EXPORTS, 1914-1915.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see FLIGHT for January 25th, 1912; for 1912 and 1913, see FLIGHT for January 17th, 1914; and for 1914, see FLIGHT for January 15th, 1915:—

	Imports.	Exports.	Re-Exportation.			
	1914.	1915.	1914.	1915.	1914.	1915.
	£	£	£	£	£	£
January ...	5,945	20,382	210	435	879	13,706
February ...	28,132	380	106	138	441	18,823
March ...	27,731	280	1,934	7,218	1,440	5,090
	61,808	21,042	2,250	7,791	2,760	37,619



Aeronautical Patents Published.

Applied for in 1913.

Published April 8th, 1915.

29,658. L. MASSAL. Aerial machines.

Applied for in 1914.

Published April 8th, 1915.

11,922. R. VERDUZIO. Envelopes for dirigibles.

16,924. J. SAMUEL WHITE AND CO., AND WRIGHT. Aeroplanes.

20,735. J. M. THORP. Alighting and launching apparatus for aeroplanes.

Published April 15th, 1915.

19,559. J. L. LEMONS. Flying machines.

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